

1 **SILICON-CONTAINING RESIST SYSTEMS WITH CYCLIC KETAL**
2 **PROTECTING GROUPS**

3
4 **ABSTRACT**

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6 Inventive silsesquioxane polymers are provided, and photoresist compositions
7 that contain such silsesquioxane polymers are provided in which at least a
8 portion of the silsesquioxane polymer contains fluorinated moieties, and at least
9 a portion of the silsesquioxane polymer contains pendant solubility inhibiting
10 cyclic ketal acid-labile moieties that have low activation energy for acid-catalyzed
11 cleaving. The inventive polymer also contains pendant polar moieties that
12 promote alkaline solubility of the resist in aqueous alkaline solutions. The
13 inventive polymers are particularly useful in positive resist compositions. The
14 invention encompasses methods of using such photoresist compositions in
15 forming a patterned structure on a substrate, and particularly multilayer (e.g.
16 bilayer) photolithographic methods, which methods are capable of producing high
17 resolution images at wavelengths such as 193 nm and 157 nm.

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